

WE CLAIM

1. A region-based method for encoding and decoding digital still images to produce a scalable, content accessible compressed bit stream comprising the steps:

decomposing and ordering the raw image data into a hierarchy of multi-resolution sub-images;

determining regions of interest;

defining a region mask to identify regions of interest;

encoding region masks for regions of interest

determining region masks for subsequent levels of resolution; and

scanning and progressively sorting the region data on the basis of the magnitude of the multi-resolution coefficients.

2. An apparatus for the region-based encoding and decoding of digital still images that produces a scalable, content accessible compressed bit stream comprising:

a means of decomposing and ordering the raw image data into a hierarchy of multi-resolution sub-images;

means of determining regions of interest;

means of defining a region mask to identify regions of interest;

means of encoding region masks for regions of interest;

means of determining region masks for subsequent levels of resolution; and

a means for scanning and progressively sorting the region data on the basis of the magnitude of the multi-resolution coefficients.

3. A region-based system for encoding and decoding digital still images that produces a scalable, content accessible compressed bit stream and comprises the steps:

decomposing and ordering the raw image data into a hierarchy of multi-resolution sub-images;

determining regions of interest;

defining a region mask to identify regions of interest;

encoding region masks for regions of interest

determining region masks for subsequent levels of resolution; and

scanning and progressively sorting the region data on the basis of the magnitude of the multi-resolution coefficients.

4. A method for encoding and decoding digital still images to produce a scalable, content accessible compressed bit stream comprising the steps:

decomposing and ordering the raw image data into a hierarchy of multi-resolution sub-images;

setting an initial threshold of significance and creating a significance index;

determining an initial list of insignificant blocks;

forming the list of significant coefficients by encoding a significant map using a quadtree representation;

recursively reducing the threshold values and repeating the encoding process for each threshold value; and

transmitting refinement bits of significant coefficients.

5. An apparatus for encoding and decoding of digital still images that produces a scalable, content accessible compressed bit stream comprising:

a means of decomposing and ordering the raw image data into a hierarchy of multi-resolution sub-images;

means for setting an initial threshold of significance and creating a significance index;

means for determining an initial list of insignificant blocks;

means of forming the list of significant coefficients by encoding a significant map using a quadtree representation;

a means of recursively reducing the threshold values and repeating the encoding process; and

transmitting refinement bits of significant coefficients.

6. A method of decoding digital still images to produce a scalable, content accessible compressed bit stream comprising the steps:

decoding the bitstream header;

determining the initial threshold values and the array of initial significant pixels, insignificant bits and wavelet coefficients;

decoding the significance maps;

modifying the significance lists and decoding the refinement bits for each threshold level;

reconstruct the wavelet coefficient array;

perform the inverse wavelet transform; and

reconstruct the image.

7. A method of transmission of digital signals that creates a scalable, content accessible bitstream comprising the steps:

pack the most significant bits of the largest coefficients first followed by refinement bits and the most significant bits that are significant for coefficients at the next bit level;

repeat this process in a recursive fashion until the desired compression size is obtained;

calculate the pack ratios to be used for each channel of the wavelet decomposition hierarchy by taking the ratio of the two largest amounts of data to the smallest amount of data;

determine the optimal amount of data to allocate for each color channel based on the user specified compressed file size; and

if performing region of interest processing, consider the packing overhead introduced by the mask when determining the bit budget for each channel.